



## Article

Development of a creativity orientation scale using EFA<sup>☆</sup>

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## ABSTRACT

In a pilot study, an exploratory factor analysis using a minimum rank factor extraction method and an oblique (Promin) rotation of 30 self-report items on a proposed Creativity Orientation Scale (COS) was conducted on a snowball sample ( $n = 237$ ). The purpose was to gain more in-depth understanding of attitudes toward and perceptions of creativity and creative individuals within the framework of social identity theory. Using the optimal implementation of Parallel Analysis (PA) retention method, a three-factor solution provided the clearest extraction. Factor 1 (creative-averse orientation) accounted for 37.32% of the variance and had seven items. Factor 2 (creative-approach orientation) accounted for 18.76% of the variance and had eight items. Factor 3 accounted for 8.31% of the variance and had only two items and therefore was not considered salient. Following rotation, these three items accounted for 64.40% of the total variance.

## Introduction

Creativity and creative individuals are integral to the innovation, productivity, and sustainability of society as well as organizations (King & Anderson, 1995; Lukersmith & Burgess-Limerick, 2013; Weiner, 2000). Despite their importance, there is a deficit of creativity and innovation in the United States (Anderson, et al., 2014; Gong, et al., 2013; Mandel, 2009; Weinstein, et al., 2014). Shoham (2003) suggested that creative innovation is stigmatized by members of a society. Mueller, Melwani, and Goncalo (2012) demonstrated a negative bias against creativity when the introduction of an innovative idea was perceived as uncertain. Indeed, research findings indicate that creative individuals are viewed as deviant (Wells, et al., 2006). In group decision making, members were found to dislike deviant members and rate morale lower despite increased innovation and creativity (Rijnbout & McKimmie, 2012). Those who are exposed to innovation often view it with suspicion or outright hostility (Klein & Sorra, 1996; Ram & Sheth, 1989) as a function of innovation resistance (Adarves-Yorno et al., 2008). This study was conducted to determine the existence of psychological constructs associated with attitudes toward and perceptions of creativity and creative individuals given a negative bias against creativity.

*Bias against creativity and creative individuals*

A review of the literature on creativity reveals a link between creativity and mental illness (Jamison, 2011; Kyaga, et al., 2013; Ludwig, 1992, 1994; Richards, et al., 1988; Richards & Kinney, 1990). Jamison (1989,

1993, 2011) reported extensively on findings that link psychopathology and mood disorders, such as manic depression and bipolar disorder, to creativity among writers and artists. Power, et al. (2015) reported findings suggesting that creative individuals possess a genetic predisposition towards divergent thinking that in combination with other maladaptive biological or environmental factors could lead to mental illnesses such as schizophrenia or bipolar disorder. Researchers also produced findings that suggest a link between creative inspiration and risk associated with bipolar disorder (Jones, Dodd, & Gruber, 2014). Likewise, an association was found between autistic traits and divergent thinking (Best, et al., 2015).

The public stigma against people with mental illness has been well-documented across cultures and within populations (Clark, et al., 2013; Cummings, Lucas, & Druss, 2013; Girma, et al., 2013a; Girma, et al., 2013b; Jamison, 2006; Perry, 2014; Yang, et al., 2014). Evidence suggests that two of the reasons that persons with mental illness are likely to avoid or delay treatment is because of the prejudice against persons with mental illness and the expectation of being discriminated against (Henderson, Evans-Lacko, & Thornicroft, 2013). Research findings have also indicated an association between creativity and deviance (Gino & Wiltermuth, 2014; Mainemelis, 2010; Spreitzer & Sonenshein, 2004; Wells, et al., 2006; Wexler, 2011). In organizational settings involving group decision-making strategies, group members were found to rate creative group members as deviant and rate morale lower despite an increase creativity (Rijnbout & McKimmie, 2012). Findings have also indicated that those who are exposed to creative or novel ideas often view them with suspicion or outright hostility (Klein & Sorra, 1996;

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Ram & Sheth 1989). Researchers have proposed that such hostility is a function of innovation resistance (Adarves-Yorno, et al., 2008).

Mueller, et al. (2012) reported the existence of a negative bias against creativity when individuals experienced uncertainty and that this bias interfered with their ability to recognize creative ideas. The results revealed a latent barrier that creative individuals might encounter in their attempts to gain acceptance for novel ideas and products. Additionally, the process of developing creative ideas dictates that creative individuals will fail often (Fleming, 2001; Simonton, 1984) and face uncertainty regarding if and when they will discover a novel solution (Metcalf, 1986; Metcalf & Wiebe, 1987). Further research by Rickards and Jones (1991) suggested differences in self-reported barriers to creative behaviors in occupational groupings categorized as strategic, value, perceptual, and self-image barriers.

A number of studies have provided insight to the cultural construction of creativity, further demonstrating its social implications. Yue (2003) found that in China, scientists, inventors, and, to some extent, politicians were perceived more often as creative individuals, whereas artists, musicians, and entertainers were the least likely to be perceived as creative individuals (see Kaufman & Lan, 2012, for an overview of East-West cultural bias and creativity). The findings extend to political ideology: Dollinger (2007) found that compared to more liberal college students, those who adopted a more conservative ideology had fewer creative accomplishments and composed photo essays and drawings perceived as less creative.

Adarves-Yorno and colleagues (2008) discovered that ingroup products were perceived to be more creative than those of outgroups in terms of quality. Their studies also indicated that this pattern is not simply a manifestation of generic ingroup bias, since judgments of creativity diverge from those of both likeability and beauty (Adarves-Yorno, et al., 2008). In contrast to those findings, Mueller, et al. (2014) reported that individuals perceived ideas that were generated geographically distant as more abstract and therefore more creative than those generated in proximal relation to the participants. Further, Mueller and Kamdar (2011) found that within a large, multinational organization, help-seeking behavior was positively correlated with creativity, but that help-giving yielded a negative correlation to creativity. The body of research supports the notion of a socio-cultural orientation regarding the perception of creativity and creative individuals.

Despite the benefits that accrue from innovation, it is reasonable to speculate that individuals, either consciously or non-consciously, may attempt to avoid uncertainty and externalizing behavior that would identify them as creative. Doing so increases the sense of ingroup inclusion. Given the negative bias toward novel ideas and creative individuals, it is advantageous to develop a scale to measure the orientation individuals adopt regarding creative tendencies and divergent thinking styles. The researcher developed a scale to explore theoretical constructs regarding attitudes toward creativity. Based on previous research, the researcher hypothesized that a factor would emerge characterizing the notion that creativity threatens the stability of the ingroup, thereby influencing individuals to adopt a negative bias toward creativity or influencing individuals not to identify as creative.

### *The Present Study*

A number of instruments have been developed to measure individuals' creative attributions (Abedi, 2000; Auzmendi, et al., 1996; Duncker, 1945; Guilford, 1950, 2013; Torrance, 2008; Wallach & Kogan, 1965). While these instruments have been integral in measuring creative attributions, four decades ago the call went out for social psychological (Amabile, 1983) and systems approaches (Csikszentmihalyi, 1988, 1999) to creativity, approaches that include social influences on creativity, which had largely been ignored in favor of the attributional approach (Amabile, 1995). Social identity theory (Tajfel, 1978; Tajfel & Turner, 1979; Turner, 1975) provides a theoretical framework to explore the social influences, specifically ingroup bias, on divergent and

convergent thinking. When an individual perceives that he or she is not a typical group member or is not fully accepted as part of the group, the individual's sense of ingroup inclusion is threatened (Pickett & Brewer, 2005). Brewer (2007) notes that "expectations of cooperation and security promote positive attraction toward other ingroup members and motivate adherence to ingroup norms of appearance and behavior" (p. 732). Creativity would, therefore, be perceived as a breach of ingroup norms.

Based on the hypothesis that individuals non-consciously suppress their creative tendencies out of the fear that they will be perceived as atypical, abnormal, or deviant, (i.e., an adaptive mechanism), the researcher developed a scale to measure attitudinal orientation toward creativity and creative individuals. Such a scale would be beneficial for at least two reasons: 1) Educators and employers could identify latent attitudes toward creativity among students and employees and provide resources and enhanced environments to encourage more creative expression, and 2) the results of conventional scales of creativity and intelligence may be skewed because of individuals' negative attitudes toward creativity. A creativity orientation scale provides a measure of concurrent validity for conventional tests and provides insight into the nature of ingroup bias, innovation resistance, and uncertainty avoidance.

## **Material and Methods**

### *Participants and Data collection*

Data were collected using an online questionnaire. A snowball sampling technique was leveraged to recruit participants. Social media such as Facebook, Twitter, and LinkedIn were employed in addition to recruiting students at a high school for visual and performing arts. Participants ( $n = 237$ ) were 67.9% female, 31.6% male (1 not reported); 14.3% identified ethnically as Hispanic or Latino and 84.8% responding as Not Hispanic or Latino (2 not reported). With regard to race, 75.9% identified as White, 8.4% as Asian, 7.2% as Two or More Races, 4.3% as Black or African American, and 3.4% reporting within other categories (2 not reported). Participants reporting hand-preference included 86.4% who identified as Right-handed, 10.2% as Left-handed, and 3.4% Ambidextrous. Average age of the participants was 41.58 ( $SD = 15.40$ ) with a minimum of 14 years and a maximum of 77. Participants' status regarding employment and education are shown in table 1 (supplementary materials).

### *Instrument*

The Creativity Orientation Scale (COS) consists of 30 items on a Likert-type scale (1 = strongly disagree, 5 = strongly agree). Four subscales based on previous research were originally identified: creative identity (6 items), creativity bias (14 items), uncertainty (6 items), and social support (4 items). The instrument requested demographic characteristics including age, gender, race, ethnicity, hand preference, and participants' status regarding employment and school enrollment. Table 2 (supplementary materials) provides descriptive statistics of the instrument.

### *Analysis*

Exploratory factor analysis (EFA) rather than principal component analysis was chosen because it assumes the measured responses are based on underlying factors, as hypothesized in research studies (DeCoster, 1998), and the researcher sought to develop a theory to understand more fully bias against creativity (Tabachnick & Fidell, 2001). Additionally, EFA deals only with shared variance, whereas principal component analysis splits variance into common variance, unique variance, and error variance and assumes that all communalities are initially 1. To explore the internal structure of the COS, Minimum Rank Factor

Analysis (MRFA, Ten Berge & Kiers, 1991) with oblique (Promin) rotation was used, as the factors were assumed to be correlated. The use of MRFA is supported by Lorenzo-Seva (2013) and Baglin (2014). The PC software package FACTOR (<http://psico.fcep.urv.es/utilitats/factor/>, Lorenzo-Seva & Ferrando, 2006) was used.

Prior to conducting the analysis with FACTOR, the data were screened by examining descriptive statistics on each item, interitem correlations, and possible univariate and multivariate assumption violations. The researcher determined that enough correlations exceeded the .30 threshold indicating evidence of sufficient communality to justify compromising factors. Additional assessments of the factorability of the data included a determinant value ( $8.21E-5$ ) greater than zero, indicating the matrix can be explained by linear combinations (Pett, et al., 2003); a significant Bartlett's statistic,  $\chi^2 = 2118.2$  ( $df = 435$ ,  $p < .001$ ), confirming that linear combinations exist (Pett, et al., 2003); and a Kaiser-Meyer-Olkin (KMO) test value (0.77) suggesting a fair degree of common variance (Friel, n.d.). These tests further indicated sufficient correlation between the items to proceed with the analysis.

## Results

An exploratory factor analysis using a minimum rank factor extraction method and an oblique (Promin) rotation of 30 self-report items was conducted on a snowball sample ( $n = 237$ ). Using the optimal implementation of Parallel Analysis (PA, Timmerman & Lorenzo-Seva, 2011) retention method, by which all factors where the sample's eigenvalues are greater than 95% of the random parallel datasets are retained, the initial unrotated EFA extraction resulted in a three-factor solution that accounted for 55.6% of the variance. Following rotation, Factor 1 accounted for 32.9% of the variance and had seven items; Factor 2 accounted for 14.45% of the variance and had eight items; and Factor 3 accounted for 8.27% of the variance and had twelve items. Inspection of the variables indicated that there were eleven items (1, 2, 10, 15, 18, 19, 22, 24, 25, 26, & 30) for which not all the categories were observed. These items were removed on recommendation and a second rotation was conducted. The second rotation yielded a three-factor solution that accounted for 64.4% of the explained common variance (table 3, supplementary materials). Factor 1 accounted for 37.3% of the variance (eigenvalue = 3.80) and consisted of five items, which is referred to as creative-averse orientation, with factor loadings above .50. Factor 2 accounted for 18.8% of the variance (eigenvalue = 1.91) and consisted of five items, which is referred to as creative-approach orientation, with factor loadings over .50. Factor loadings of .71 or higher can be regarded as "excellent," .63 as "very good," .55 as "good," .45 as "fair," and .32 as "poor" (Comrey and Lee, 1992). Factor 3 accounted for 8.31% of the variance, but only 2 items loaded on this dimension, when four to five items are recommended (Meyers, Gamst, & Guarino, 2006). The lack of salience made it difficult to create a subscale based on this factor. Bentler's simplicity index,  $S = 0.96005$  (Bentler, 1977) and the Loading Simplicity index,  $LS = 0.32111$  (Lorenzo-Seva, 2003) indicated that the simple solution was at its maximum.

## Discussion

Previous research has supported the existence of a negative bias toward innovation and creative individuals, referred to as innovation resistance (Adarves-Yorno, et al., 2008) and uncertainty avoidance (Mueller, et al., 2012). Theoretically driven and employing an empirically based analysis, the current study supports the existence of such a bias and further provides evidence of latent psychological constructs to which the researcher refers as creative-averse and creative-approach

orientations. Individuals who adopt a creative-averse orientation perceive innovation and creative individuals as threats to the stability of the ingroup, supporting the notion of ingroup bias within the context of social identity theory (Tajfel, 1978; Tajfel & Turner, 1979; Turner, 1975) and behavior with regard to threats to individuals' sense of ingroup inclusion (Pickett & Brewer, 2005). As such, creative-averse orientation may be viewed as an adaptive mechanism that helps to ensure ingroup stability, albeit to the peril of innovation and divergent thinking. Additionally, the results offered evidence of a second construct referred to as creative-approach orientation. Individuals who adopt a creative-approach orientation perceive innovation and creative individuals as assets and may identify as creative.

This study contributes to the body of research on creativity by exploring a psychological construct within the frameworks of social psychology and a systems approach that may influence negative biases toward innovation as well as attitudes that support creative ideation and behavior. It is important that schools and businesses are aware of this bias and work towards eliminating or diminishing creative-averse environments. Scales such as the COS can be administered to determine the presence and level of creative-averse orientation so that strategies to ameliorate it may be implemented.

## Future research

It would be advantageous to continue to conduct research on creativity within a social psychology (Amabile, 1983) or a systems approach (Csikszentmihalyi, 1988, 1999), specifically focusing on social influences to complement the previous work on attributional influences (Amabile, 1995). As employed in the current study, social identity theory (Tajfel, 1978; Tajfel & Turner, 1979; Turner, 1975) provided an appropriate theoretical framework to explore further the social influences, specifically ingroup bias, on divergent thinking, innovation, and individuals' attitudinal orientation regarding creativity and creative individuals.

A parsimonious version of the COS consisting of only the items that contribute to the creative-averse and creative-approach orientation subscales will be administered utilizing confirmatory factor analysis (CFA) to verify the factor structure that the EFA has produced. Further analysis may include concurrent validity testing with such scales as the five-factor model of personality (Gosling, et al., 2003) to explore the degree to which either of the subscales correlate to the trait dimensions of extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience.

## Limitations

The study was limited in several ways. First, sample size was only moderate. Though several sources provide guidelines that indicate the current study's sample size as adequate (Comrey & Lee, 1992), a larger sample size may be necessary to achieve higher loadings on each salient factor. Further, because the participants were recruited through social media, drawing initially from the researcher's contacts, the snowball sample may be homogeneous with regard to attitudes toward creativity, thereby skewing the responses and results. Future work modifying current or creating additional items to represent creative-averse and creative-approach orientations may be necessary to attain stronger reliability and construct validity.

## Appendix

Table. A1, Table. A2, Table. A3

**Table A.1**  
Current status regarding employment and education (n = 237)

Status	Percent
Full-time employment/Not attending school	48.9
Not employed/Not attending school	15.6
Not employed/Full-time school	11.8
Part-time employment/Not attending school	10.1
Part-time employment/ Full-time school	5.5
Full-time employment/Full-time school	3.0
Full-time employment/Part-time school	2.1
Part-time employment/Part-time school	2.1
Not employed/Part-time school	0.8

**Table A.2**  
Descriptive statistics of COS items (n =237)

Item	M (SD)
1. I am a creative person	4.17 (0.81)
2. My ideas are often different from the ideas of others.	4.00 (0.79)
3. Creative people add value to our organization.	4.54 (0.61)
4. Creative people are good at problem solving.	4.10 (0.90)
5. I do not trust creative people.	1.57 (0.80)
6. I prefer to be around people who are creative.	4.08 (0.87)
7. I would prefer not to let others see my creative side.	2.06 (0.88)
8. Creative people are strange.	2.47 (1.09)
9. I am not a creative person.	1.80 (0.90)
10. Creative people are not normal.	2.16 (1.11)
11. Creative people interrupt the workflow.	2.05 (0.89)
12. Creative people are dishonest.	1.50 (0.76)
13. Creativity and innovation are necessary for a strong economy.	4.52 (0.75)
14. I would like to be more creative.	4.26 (0.79)
15. It is important for me to be part of a group.	3.05 (1.05)
16. I would prefer to work alone.	3.27 (0.94)
17. Society imposes too many rules on me.	3.09 (1.04)
18. I like to think outside-of-the-box.	4.08 (0.71)
19. I do not like change.	2.46 (1.01)
20. The idea of change excites me.	3.63 (0.91)
21. I do not like the notion of change.	2.30 (0.93)
22. Without creative and innovative people, society does not progress.	4.37 (0.83)
23. Creative individuals are a threat to traditional values.	1.91 (1.06)
24. Innovation and creativity are not important to my success.	1.81 (0.99)
25. Change is a necessary part of life.	4.47 (0.69)
26. I enjoy taking risks.	3.45 (0.93)
27. Taking risks makes life more exciting.	3.69 (0.90)
28. I am more creative when I contribute anonymously to a project.	2.77 (1.04)
29. I believe learning new procedures is a waste of my time.	1.63 (0.69)
30. Creativity is good only is small increments.	1.90 (0.86)

Note: Items 5, 7-12, 19, 21, 23, 24, 29, and 30 were reverse coded.

**Table A.3**  
Rotated factor loading matrix from exploratory factor analysis with promin rotation with associated Eigenvalues (N = 237)

Variable	Factor Loading			Communality
	1	2	3	
11. Creative people interrupt the workflow.	.62			.52
23. Creative individuals are a threat to traditional values.	.55			.45
12. Creative people are dishonest.	.52			.48
5. I do not trust creative people.	.52			.49
8. Creative people are strange.	.51			.57
7. I would prefer not to let others see my creative side.	.38			.44
3. Creative people add value to our organization.		.82		.78
13. Creativity and innovation are necessary for a strong economy.		.72		.78
14. I would like to be more creative.		.68		.79
6. I prefer to be around people who are creative.		.63		.65
4. Creative people are good at problem solving.		.59		.62
17. Society imposes too many rules on me.		.40		.54
27. Taking risks makes life more exciting.		.35		.51
16. I would prefer to work alone.		.33		.29
20. The idea of change excites me.			-.76	.78
21. I do not like the notion of change.			.65	.48
Eigenvalues	3.80	1.91	0.85	
% of Variance	37.32	18.76	8.31	
Coefficient Alpha	.75	.87	.74	

Notes: Factor loadings below .30 are excluded. Factor 1 = creative averse. Factor 2 = creative approach.



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